unduly critical of all other evidence is a fault on the right side. He has succeeded in including work which appeared almost up to the time of publication of the book, and has produced a most valuable account of what is known of the subject.

AMERICAN GEOLOGY.

Geology: Shorter Course. By Thomas C. Chamberlin and Rollin D. Salisbury. Pp. xviii+978. (London: John Murray, 1909.) Price 21*s.* net.

A College Text-book of Geology. By the same. Pp. xviii+978. (New York: Henry Holt and Co., 1909.)

THESE are respectively the English and American editions of the same work, and each weighs 3 lb. 10 oz., without in any way approaching the dimensions of a German "Handbuch." We are not clear in this case if the insertion of an English title-page adds to the price of the work; but we note that the larger text-book by the same authors costs 63*s.* in London and 50*s.* in New York. This "shorter course" is not one that could be used in colleges in our island, except as a description of the geology of North America; while as a reference-book on this subject and on the valuable original views of the authors the larger work is manifestly superior.

It is a misfortune, which often must be felt in our own colonies, that text-books on natural history require a local setting and foundation; even the first 413 pages of Messrs. Chamberlin and Salisbury's shorter course, dealing with physical geology, are almost entirely illustrated from American sources, and are, of course, all the better on that account, in view of the intentions of the authors. Maps of the United States Topographic Survey are utilised effectively, as in Mr. Salisbury's treatise on physiography; and the photographs of landscape-features, such as the rippled sand-dune on p. 100, the Bad-land topography on p. 135, and the dust-cloud of Pélée on p. 381, are so beautifully reproduced that we cannot blame the publishers for their choice of heavy paper. "La Croix," by the by, in the description of the last-mentioned picture, should be Lacroix; "Gyrvan" on p. 406 is our Scottish Girvan; and "the Achäischen earthquake" on p. 348 is surely an accidental hybrid. The esker of Punkaharju, shown on p. 273, is not in Scandinavia, but in Finland. But there are very few misprints in this handsome volume.

The account of glacial phenomena is of especial interest, and the views of various writers as to glacier-motion are carefully stated (pp. 280–8). There is probably less difference between the views of Tyndall and James Thomson (not "Thompson") than is here suggested; Tyndall himself wrote in his "Forms of Water,"

"the gist of the Regelation Theory is that the ice of glaciers changes its form and preserves its continuity under *pressure*, which keeps its particles together."

He does not appear to have insisted upon actual fracture as *necessary* to glacier-motion.

Other interesting discussions are that of the planetesimal origin of the solar system, which is here concisely treated (p. 420), and that of the depth to which water from the surface may penetrate the earth (p. 197). Excellent diagrams are given of the effects of faulting and folding on the outcrops of strata on a level surface.

In the stratigraphical section of the book, we may note that an Archeozoic era is accepted, its rocks being in part sedimentary, but lying unconformably in most places beneath those of the Proterozoic (Algonkian) era. Diagrammatic maps after De Lapparent are given to show the distribution of certain strata in Europe; but their scale is too small to render them serviceable as guides. That of the Devonian system, for example, allows of the existence of only the Lower Devonian series in the British Isles, and the disposition of the Devonian lakes in Wales and Ireland is singularly capricious. Maps of North America are given for each system, usefully discriminating between actual outcrops and conjectural extensions.

The Carboniferous period is divided into a lower Mississippian and an upper Pennsylvanian period; the Cretaceous into Comanchean and Cretaceous proper. This last subdivision, however, raises exactly the same difficulties as the attempt to restrict Silurian to the upper part of the old Silurian system. European readers will gain greatly from the last half of the book. Though they cannot accept it as their only text-book of geology, they will recognise at all points the originality and perception of the authors.

G. A. J. C.

ELECTRIC WAVES IN THEORY AND PRACTICE.

(1) *Electric Waves. An Advanced Treatise on Alternating-current Theory.* By Prof. W. S. Franklin. Pp. x+315. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1909.) Price 3 dollars net (10*s.* net).

(2) *Wireless Telegraphy and Wireless Telephony. An Elementary Treatise.* By Prof. A. E. Kennelly. Second edition. Pp. vii+279. (London: T. Fisher Unwin, 1909.) Price 4*s.* net.

(3) *Wireless Telephones and How They Work.* By Dr. J. Erskine-Murray. Pp. iii+68. (London: Crosby Lockwood and Son, 1910.) Price 1*s.* 6*d.* net.

(4) *Handbook for Wireless Telegraph Operators.* Published for official use. October, 1909. Price 3*d.*

(1) PROF. FRANKLIN'S treatise, although by its title it might be expected to deal more particularly with that class of electric waves used in Hertzian telegraphy, deals with the whole subject of electromagnetic waves, and is more adequately described by its sub-title. Indeed, the subject of wireless telegraphy is given, if anything, less than its fair share of attention on the ground that it is already adequately treated in Fleming's "Principles of Electric Wave Telegraphy." It is to be wished that all authors showed a similar moderation and restraint. The volume opens, after a brief introductory chapter, with two chapters on water waves and wave trains, which serve as a useful introduction to the principal ideas of wave motion. The next four chapters deal

with the general mathematical theory of electromagnetic waves, with special reference to transmission and telephone lines, and in the sixth chapter Hertzian telegraphy is briefly discussed from the practical side. The next two chapters, forming the second part of the volume, deal with harmonic analysis and non-harmonic E.M.F.'s and currents, and bear directly on the problems met with in alternating-current machinery. The mathematics is advanced, and the book is only suitable for advanced students. In an appendix are given eighty-eight problems for the student to work out, and there are a number of very excellent diagrams.

(2) Prof. Kennelly describes his book as an elementary treatise; it covers both the theoretical and practical side of wireless telegraphy and telephony, and is admirably suited for the reader with only very slight technical knowledge. The exposition of the theoretical side is clear, and the description of practical methods, though short, is sufficient to give a general idea of the present position of the art. The only objection which we have to raise against the book is on account of the diagrams, which are numerous but far from clear. Those in the earlier part of the book especially are on so small a scale that they are practically unintelligible; this is the more to be regretted as the type and paper are excellent, and there is no apparent reason why the diagrams should not be equally well reproduced.

(3) Dr. Erskine-Murray's little book is a popular exposition of the methods and present position of wireless telephony. Dr. Erskine-Murray combines a thorough knowledge of his subject with the power of clear and simple explanation, and we know of no better book for those of the general public who are anxious to know how wireless telephony now stands. We are rather doubtful whether the somewhat rosy view of the future taken in the last chapter is likely to be realised, although the advances already made make one chary of expressing too strong a doubt.

(4) No stronger evidence of the assured position of wireless telegraphy as a commercial means of communication could be afforded than the publication of this little Government handbook. The book itself does not call for much comment, since it contains only instructions and regulations for operators on board ship or in coast stations, but that such regulations should be called for is a more convincing proof that wireless telegraphy has settled down to the steady enjoyment of its own kingdom than any number of treatises or popular booklets. The position of wireless telephony to-day is much the same as that of wireless telegraphy ten years ago. Will 1920 see the issue of a Government handbook for wireless telephone operators?

OUR BOOK SHELF.

The Liverpool Geological Society. A Retrospect of Fifty Years' Existence and Work. By W. Hewitt. Pp. 117. (Liverpool: C. Tinling and Co., Ltd., 1910.)

THE Liverpool Geological Society, which was established on December 13, 1859, has signalised its jubilee by the publication of this volume, which includes an account of the history of the society and its geological labours, a list of papers printed in the Proceedings, and biographical notices of some past members. The society originated from a meeting held at the residence of G. H. Morton, who was its real founder, and for about forty years the chief moving spirit among the members. A capital portrait of him is given. Well known as the author of a volume "On the Geology of the Country around Liverpool," and of a series of important papers on the stratigraphy and palæontology of the Carboniferous rocks of Flintshire, he was one of the most distinguished of provincial geologists. By regarding the country within fifteen miles of Liverpool as their proper sphere of study, the society took the Carboniferous limestone series of Flintshire as their foundation-rocks, together with the succeeding Millstone Grit, Permian, Trias, Pleistocene, and Recent deposits.

On all these formations the members of the society have done excellent work. Undoubted Permian strata, including a bed of magnesian limestone with Schizodus, were described by Mr. E. Dickson at Skiliaw Clough, near Parbold. The researches of the late T. Mellard Reade on the Triassic rocks, the Glacial Drifts, and the recent physical changes in the Lancashire district are well known. His portrait is included; also that of Dr. Charles Ricketts, another enthusiastic worker who dealt with many local physical problems. There is one other portrait, that of Joseph Lomas, who had done much in investigating the fauna, flora, and origin of the Trias. Unfortunately, a railway accident in Algeria terminated the life of this zealous and genial worker at the early age of forty-eight. Photographic plates are given of the famous footprints of Cheirotherium from the Keuper Sandstone of Storeton, in Cheshire, described by Morton; and of the gypsum boulder from the Glacial Drift of Great Crosby, described by Mellard Reade. The volume has been carefully prepared, and is a valuable and interesting record of the work of Liverpool geologists.

Catalogue of the Lepidoptera Phalaenae of the British Museum. Vol. ix. Catalogue of the Noctuidæ in the Collection of the British Museum. By Sir George F. Hampson, Bart. Pp. xv+552; plates cxxxvii-cxlvii. (London: Printed by Order of the Trustees British Museum [Natural History]; Longmans and Co.; B. Quaritch; Dulau and Co., Ltd., 1910.) Catalogue 15*s.*; plates, 12*s.*

WE have again to congratulate the authorities of the British Museum and the indefatigable author on the appearance, within less than a year, of another volume of this highly important descriptive catalogue of moths. It is the sixth which has been devoted to the Noctuidæ, and is the third and last volume dealing with the great subfamily Acronyctinæ, of which 385 genera and 2288 species (a large proportion new) are described, and a great number illustrated in the three volumes devoted to the subfamily.

It may be useful to note that at the commencement of his work Sir George gave a table of fifty-two families of Lepidoptera, of which seven (families 33–39 inclusive) are butterflies, placed between family 32, Castiniadæ, and family 40, Euschemonidæ, the remaining forty-five families being moths. Of these, the first three, the Syntomidæ, Arctiadæ, and Agaristidæ, are described in the three first volumes of the work; while of the fifteen subfamilies into which the Noctuidæ are divided at the commencement of vol. iv., only the first four subfamilies have yet been dealt with. It therefore follows that the nine volumes which have hitherto appeared cannot be expected to represent a quarter, and perhaps not even a tenth, of the whole work, although